Lesson plan/note for week 6 ending, 17th February,2023

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| Term | 2nd term |
| Week | Week 7 and 8 |
| Date | 13th / 16th February,2023 |
| Class | JSS 3 |
| Subject | Basic Science |
| Topic | Radioactivity |
| Sub-topic | Uses and Dangers of Radioactivity |
| Period | 8th/9th |
| Time | 1:20-200pm/2:00-2:30pm |
| Duration | 40 minutes/ 30 minutes |
| Number in class | Thirteen |
| Average age | 13 years |
| Sex | Mixed |
| Specific objectives | By the end of the lesson, the students should be able to:  1.Define radioactivity and mention radioactive elements.  2.State the types of radioactivity and their properties  3.Explain the uses of radioactivity  4.State the dangers of radioactivity. |
| Rationale | To enable students understand the meaning, types, uses and dangers of radioactivity. |
| Previous knowledge | Students having not been taught radioactivity. |
| Instructional resources | Pictures and charts from reference textbook |
| Reference material | 1.Excellence in Basic Science and Technology for JSS 3 by Olushola Felix Bello et al.  2.Fundamentals of Basic Science for JSSS 3 by Adebesin O Michael |

LESSON DEVELOPMENT

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| Steps | Teacher’s Activities | Students’ Activities | Learning |
| Introduction | Teacher revises the previous topic | Students listen to teacher | To arouse students' interest |
| Step I | Teacher defines radioactivity and mentions some examples of radioactive elements | Students listen to teacher | To keep students focus on the lesson |
| Step II | Teacher states the types of radioactivity and explains their respective properties | Students listen and ask questions where necessary | To keep students focus on the lesson |
| Step III | Teacher explains the uses of radioactivity to students | Students pay attention | To keep students focus on the lesson |
| Step IV | Teacher guides students to state the dangers of radioactivity | Students take part in class discussion | To encourage critical thinking |
| Board summary | Radioactivity  Radioactivity is the spontaneous disintegration of an unstable atomic nucleus or isotope leading to an emission of radiation. It is thee release of particles or rays of energy when certain elements break down.  Radioactivity was first discovered by Henry Bacquerel in 1896. He noticed while performing some experiment that Uranium gave out some kind of rays that would penetrate through thick black paper and affect a photographic plate placed on the other side. His discovery was confirmed by Marie Curie and her husband, Pierre Curie in 1898.  Radioactive Elements  These are elements whose nucleus or isotope emits radiation or one or more particles and transform into different nuclei or isotopes.  Radioactive elements include:  1.Polonium  2.Radon  3.Radium  4.Thorium  5.Uranium  6.Plutonium  Radioactive Decay  Radioactive decay is the process in which unstable atoms lose energy by emitting radiation in the form of particles or electromagnetic waves. Decay is said to occur in the parent nucleus when it produces a daughter nucleus.  Half life of a Radioactive Element  This refers to the amount of time it takes for half of the original isotope to decay.  Example:  Let the half life (T1/2) of a radioisotope be 10 years starting now with 80 atoms of this isotope. How many atoms will be left after 40 years?  Solution  40÷10=4  The material will go through 4 half lives.  >80 atoms 1st half life 40 atoms  >40 atoms 2nd half life 20 atoms  >20 atoms 3rd half life 10 atoms  >10 atoms 4th half life 5 atoms.  Therefore, 5 atoms will be left after 40 years.  Types of Radiation  There are three(3) main types of radiation emitted by radioactive isotopes, namely:  1.Alpha particles  2.Beta particles  3.Gamma rays  Properties of Alpha Particles  1.It is heavier than other types of radiation with atomic mass of 4 and atomic number of 2 and are positively charged (Helium atom)  2.It has the least penetrating power.  3.They are deflected by both electric and magnetic fields.  4.They are stopped by thin sheet of paper.  5.It has the highest ionizing energy.  Properties of Beta Particles  1.It is heavier than gamma ray but not as heavy as alpha particles and are negatively charged electrons  2.Its penetrating power is higher than that of alpha particles but less than that of gamma rays.  3.It cannot be stopped by thin sheet of paper but by only metal of few millimeters thick e.g Aluminum  4.They can be deflected by both electric and magnetic field.  5.Their ionizing power is much less than that of alpha particles.  Properties of Gamma Rays  1.Gamma rays have no mass and no charge.  2.It has the most penetrating power age compared to alpha and beta particles.  3.They are not deflected by both electric and magnetic fields.  4.They cannot be stopped by paper nor thin sheet of metal but by thick block of lead.  5.They have the least ionization energy.  Uses of Radioactivity  Radioactivity is useful in the following ways:  1.Medical treatment of cancer: Skin, breast and other forms of cancer can be treated with gamma ray from radioisotope of Cobalt.  2.Carbo dating: Animals and plants have a known proportion of carbon-14 (a radioisotope of carbon) in their tissue. The age of the ancient organic materials can be found by measuring the amount of carbon-14 that is left.  3.Sterilization of food and medical equipment: Gamma ray can be used to sterilize medical equipment. It can also be used to irradiate food in order to kill germs especially in canned foods.  4.Radioactive tracers: Radioisotopes can be used as tracer in the industry and hospitals. They are used to find out what is happening inside an object without the need to break into the object.  5.Thickness control: In paper mill, the thickness of the paper can be controlled by measuring how much beta radiation passes through the paper to a Geiger counter.  6.Checking welds: If a gamma source is placed on one side of the welded metal, and a photographic film on the other side, weak points or air bubbles will show up on the film, like an X-ray.  Dangers of Radioactivity  1.Radioactivity can cause gene mutation which can result in deformities in unborn children.  2.It causes cancer of the blood also known as leukemia.  3.Beta particles can penetrate the body destroying healthy living cells causing the abnormal growth of cells (tumours)  4.Due to its emission of great amount of energy, it can be used in making bomb which is a destructive tool in fighting wars. | Students copy note | To serve as reference point to students |
| Evaluation | Teacher asks students the following questions:  1.Define radioactivity and mention four(4) radioactive elements.  2.State the three types of radiation and two(2) properties of each.  3.Explain three(3) uses of radioactivity.  4.State four(4) dangers of radioactivity. | Students respond to teacher’s questions. | To ascertain students’ understanding of the lesson. |
| Conclusion | Teacher assesses students and make corrections where necessary | Students take correction | To ensure a better understanding |
| Assignment | 1.In a tabular form, state the differences among the three types of radiation.  2.State two uses each of radiation in medicine and industrial process respectively. | Students write down the assignment | To engage students at home. |